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THE SAND WIREWORM

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The sand wireworm (Horistonotus uhlerii Horn) is a serious pest of corn, cotton, cowpeas, and other crops in certain areas of the coastal plain in South Carolina, and also, at times, in parts of Illinois, Missouri, Arkansas, Texas, Mississippi, Florida, Georgia, and North Carolina. It is found in porous, light, sandy soils which are usually deficient in humus.

How the Wireworm Lives

In the life of a wireworm there are four stages -- egg, larva (wireworm), pupa, and adult. The adult is a small, slender, dark-brown click beetle, about $\frac{1}{4}$ to $\frac{1}{8}$ inch in length. After mating, the female burrows into the soil and deposits her eggs, which hatch into the tiny wireworms about 12 days later. The egg-laying period in South Carolina is during June and July.

The newly hatched wireworms soon find their way through the soil to the roots and underground stems of certain plants, where they feed and develop throughout the summer. The larvae are approximately half grown by October. With the approach of winter the larvae go deeper into the soil and remain there until spring. Some have been found during the winter as deep as 30 inches. During March and April the wireworms move upward and again start feeding on the subterranean parts of certain plants. Feeding usually continues until June, when the larva becomes fully mature. At this time it is dirty-white in color, slender and threadlike, with a characteristic knotted appearance, and $\frac{3}{4}$ to $1\frac{1}{4}$ inches long. Altogether the larval stage requires about 350 days.

The fully mature wireworm then enters the pupal stage, during which it neither feeds nor moves about. This stage lasts approximately 12 days, after which the adult, or click beetle, appears.

In South Carolina the entire life cycle from egg to beetle requires almost exactly 1 year. Seasonally, it may be summarized about as follows: June and July, eggs; July to May, wireworms; May and June, pupae; June and July, adults.

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How the Wireworm Damages Crops

Damage by the sand wireworm is caused by the feeding of the larvae upon the roots, underground stems, seeds, seed pieces, and tubers of plants. It may bore into a stem, gnaw small pits in the surface of a seed, seed piece, or tuber, or cut off small roots. The injury caused by this insect often kills the germinating seed of plants such as beans, peas, cotton, and melons, resulting in poor stands of the plants. Injury to corn is most noticeable as a stunting or dwarfing of the plants caused by the loss of feeder roots.

The adult, or click beetle, is winged and is a comparatively strong flier. It rasps the leaves and stems of plants and feeds upon the sap which comes from the injured plant tissues, but such injury is seldom of economic importance.

How Farm Practices Will Reduce Losses from Wireworms

In following the cultural practices recommended, it must be kept in mind that the crop-planting plans and planting dates are given for South Carolina, and that in other sections they may be different.

Increasing soil fertility

Land infested with the sand wireworm is almost invariably deficient in humus. Experiments have shown that much benefit can be obtained and losses due to wireworms reduced by the adoption of farm practices which will build up soil fertility.

Land resting

Land resting has been practiced by growers for many years with success in ridding lands of heavy infestations of wireworms. As the adult beetles emerge they are attracted to fields of such crops as corn, cotton, or cowpeas in order to lay their eggs. Therefore, when the beetles emerge from uncultivated land many of them fly to adjacent fields in which attractive crops are growing. As a result the wireworm infestation will be lighter the following year in the untilled fields and heavier in the fields where the adult beetles laid eggs. Resting land for one year is usually sufficient, but when the land is heavily infested it may be desirable to rest a field for two successive seasons. Such fields may be used satisfactorily for pasturing.

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Crop resistance

Some crops are more susceptible to wireworm injury than others, either because of their ability to withstand the attack or because of the time the crop is planted.

Tomatoes, asparagus, early-planted melons and cucumbers, peanuts, oats, rye, Austrian winter peas, velvet beans, sweetpotatoes planted after July 10, and dewberries are often attacked but are seldom seriously injured.

Cabbage and burr clover are seldom injured.

Corn, cotton, cowpeas, potatoes, late-planted melons and cucumbers, early sweetpotatoes, and native lespedeza are especially susceptible to injury.

Crop-planting plans

Land planted in susceptible crops for 2 or more years may quickly build up a large wireworm infestation. Hence it is important to follow a crop-planting plan that will avoid this danger and at the same time build up soil fertility. The plans that follow are suggested.

When the land is heavily infested with wireworms the following 2-year planting plan should reduce losses from wireworms:

First year.--Starting in the fall, sow a crop of small grain, such as oats or rye. After harvesting the grain in the spring, the land should lie idle until about July 10, when sweetpotatoes, a cover crop, or hay can be planted. Late in the fall, plant a winter cover crop, such as Austrian winter peas or vetch.

Second year.--Early in the spring of the second year the winter cover crop should be turned under and the land planted to corn, cotton, or other crop susceptible to wireworm injury. Immediately after the harvest of the susceptible crop the land should be seeded to oats or rye, beginning again the first year of the 2-year planting plan.

When the wireworm infestation is known to be light the following three year planting plan may often be used to advantage:

First two years.--Use the 2-year plan for the first 2 years. After the susceptible crop is harvested in the fall of the second year, plant a winter cover crop of Austrian winter peas or vetch.

Third year.--Turn under the cover crop early in the spring and plant the land to one of the crops less susceptible to wireworm injury, such as velvetbeans, tomatoes, or early watermelons. As soon as this crop is harvested, seed the land with a winter grain crop of oats or rye, beginning again the first year of the 3-year planting plan.

The schedule at the end of this circular shows both the 2-year and the 3-year planting plans that have been outlined above.

Planting dates

The eggs laid during June and July produce the infestations of wireworms that are injurious the following spring. In South Carolina the period of greatest damage to crops by this wireworm is from about April 15 to June 15. Consequently crops susceptible to severe injury, such as corn, cotton, cowpeas, potatoes, sweetpotatoes, or melons, should not be planted during this period in lands known to be heavily infested with wireworms.

Since about 75 percent of the eggs are laid during the period June 15 to July 10, there is a likelihood of avoiding a heavy wireworm infestation the following spring in fields that are not planted in crops attractive to the beetles during this important egg-laying period. A further advantage of planting attractive crops after about July 10 is that a crop planted after this date will not be subject to appreciable damage from the small wireworms that hatch during the season.

TWO-YEAR CROPPING PLAN

First Year Planting		Second Year Planting	
Nov. to late	March	July 10	Nov. to late
Feb. or early	to	to	Feb. or early
March	July 10	October	March
Winter cover	Spring	Summer	Winter cover
Oats or rye	Grain	Cover crop,	Austrian
	followed	hay, or	winter peas
	by stubble	sweetpotatoes:	or vetch
			corn

THREE-YEAR CROPPING PLAN

First Year Planting		Second Year Planting		Third Year Planting	
Nov. to late	March	July 10	Nov. to late	March	October to
Feb. or early	to	to	Feb. or early	to	February or
March	July 10	October	March	September:	March
Winter cover	Spring	Summer	Winter cover	Main crop:	Winter cover
	Grain	Cover crop,	Austrian	Cotton	Austrian
	followed	hay, or	winter peas	or	winter peas
	by stubble	sweetpotatoes	or vetch	corn	or vetch
					early
					watermelons

Note.—The 2-year planting plan is for land having a heavy wireworm infestation; and the 3-year planting plan is for land having a wireworm infestation known to be light.

